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UACE P515/2 Principles and practices of agriculture 2018

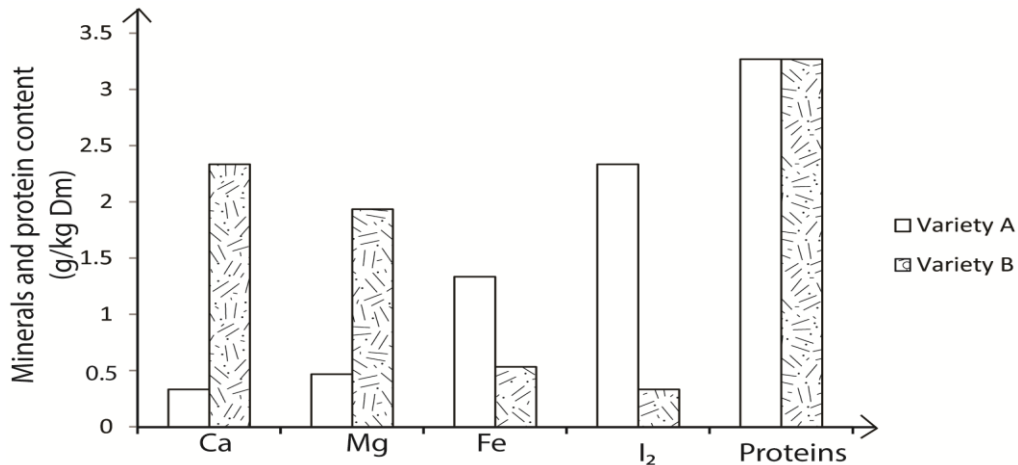
Instructions

- This paper consists of sections: **A, B, C, D and E**
- Answer **question 1** in section A and four other questions, selecting **one** from each of the sections **C, D and E**.
- Write your answers in the answer booklets provided
- Any additional question(s) answered will not be marked

SECTION A (20MARKS)

Question 1 is compulsory

1. A study was carried out on two varieties of elephant grass to determine the content of macro and micro nutrients and proteins in them. The two varieties were planted and harvested at the same time although grown in different fields. The results are shown in the figure below. The minimum required content of macro and micro nutrients is 1.5g/kg Dm and 0.8g/kg Dm respectively



- (a) What is the difference between macro and micro nutrients?
- (b) What observations and conclusions can be drawn from the result in the figure above
- (c) Account for the difference in the mineral content of the two varieties
- (d) What would be the effect of grazing dairy animals on variety A alone.
- (e) What is the best way of utilizing the two varieties of pasture?

- (f) Give three ways in which proteins are important in the bodies of animals

SECTION B (20MARKS)

CROP PRODUCTION

Answer **one** question from this section

2. (a) Differentiate between soil texture and soil structure (02marks)
(b) Explain how soil structure can be destroyed. (09marks)
(c) Describe factors that affect the rate of decomposition of organic matter. (09marks)
3. (a) Discuss the effect of weeds on crop production. (10marks)
(b) Explain farming practices that encourage weed infestation. (05marks)
(c) Give reasons to explain farmers' efforts to eradicate weeds have not been very successful (05 marks)

SECTION C (20MARKS)

ANIMAL PRODUCTION

Answer **one** question from this section

4. (a) Explain why housing is important in poultry production (06marks)
(b) Describe the requirements of a good litter house (09 marks)
(c) Outline the importance of having litter in a poultry house (05marks)
5. (a) Distinguish between inbreeding and outbreeding as used in animal breeding. (02marks)
(b) Outline the objectives of livestock improvement. (08marks)
(c) Explain measures that can be taken to maintain a high breeding efficiency in a herd. (10marks)

SECTION D (20MARKS)

AGRICULTURAL ENGINEERING

Answer **one** question from this section

6. (a) Explain why stores are important on a farm. (09marks)
(b) What precautions should be taken to ensure proper storage of farm produce? (06marks)
(c) Outline problems faced by farmers storing farm produce. (05marks)
7. (a) Explain factors that limit the use of animal traction in farming (12marks)
(b) Suggest ways of increasing power output from draft animals. (08marks)

SECTION D (20MARKS)

AGRICULTURAL Economics

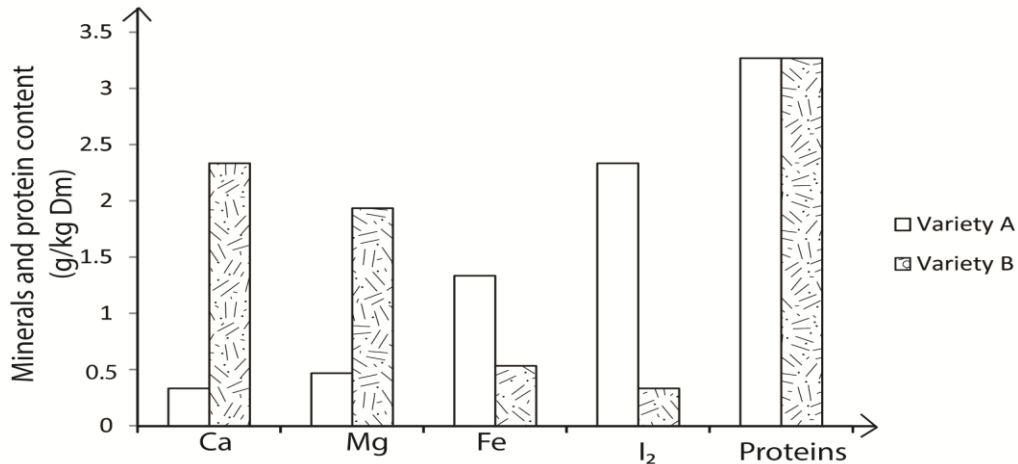
Answer **one** question from this section

8. (a) Outline problems associated with overpopulation. (08 marks)
(b) Discuss measures that can be taken to ensure food security in developing countries (12 marks)
9. (a) What **is agricultural development**? (02marks)
(b) Explain the role of government in promoting agricultural development (12marks)
(c) Why are extension workers important in rural agricultural development? (06 marks)

END

Suggested answers

2. A study was carried out on two varieties of elephant grass to determine the content of macro and micro nutrients and proteins in them. The two varieties were planted and harvested at the same time although grown in different fields. The results are shown in the figure below. The minimum required content of macro and micro nutrients is 1.5g/kgDm and 0.8g/kg Dm respectively



- (a) What is the difference between macro and micro nutrients?
Macro elements are nutrients required by plants or animals in large quantities and if the supply is inadequate they produce deficiency symptoms while micro nutrients are required in small quantities and when supplied in excess produce toxic results.
- (b) What observations and conclusions can be drawn from the result in the figure above
Observation
- Variety B contained more calcium and magnesium than variety A
 - Variety A contained more iron and iodine compared to variety B
 - Both varieties contained equal content of proteins
- Conclusion
- Both varieties A and B contain all nutrients but in varying quantities
- (c) Account for the difference in the mineral content of the two varieties
- Difference in the mineral contents of the two fields
 - Differences in genetic composition of the two varieties leading to difference in absorption and utilization of minerals.
- (d) What would be the effect of grazing dairy animals on variety A alone.
It would result in deficiency disease due to calcium such as milk fever.
- (e) What is the best way of utilizing the two varieties of pasture?
- Mixing them before feeding to the animals
 - Add mineral supplements before using any of them.
- (f) Give three ways in which proteins are important in the bodies of animals
- Make up body structure
 - Make up hormones

- Make up enzymes
- Source of energy
- Maintain blood pH

SECTION B (20MARKS)

CROP PRODUCTION

Answer **one** question from this section

2. (a) Differentiate between soil texture and soil structure (02marks)

Soil structure refers to the fineness or coarseness of the mineral particles of the soil while refers to the general arrangement of soil particles within a soil mass to form aggregates.

- (b) Explain how soil structure can be destroyed.

- Continuous cultivation of the soil breaks soil aggregates
- Ploughing soil with high moistures breaks soil aggregate
- Soil erosion washes away top soil
- Poor sol drainage limits soil organisms that would otherwise enhance soil structure
- Excessive leaching of calcium and iron that bind the soil aggregate
- Pollution that kill microorganism that would otherwise enhance soil structure
- Use of heavy machines that deform/compact soil
- Poor harvesting practices that do not add organic matter to the soil
- The amount of organic matter in the soil. Soil with much organic matter requires more lime because it has high cation adsorption capacity.
- Depth of the soil: deeper soil experiences high rate of leaching and thus requires larger amounts of lime.
- Frequency of application of lime; infrequent application of lime requires high amount per application.
- Fineness of limestone or carbonate used

- (c) Describe the factors that affect the rate of decomposition of organic matter.

- Age of the plant- young plant materials decompose faster than old ones
- Amount of water in the material: wet materials decompose faster than dry ones
- Carbon: nitrogen ration – legumes decompose faster than cereals because they have high percentage of nitrogen.
- Presence of putrefying organisms; for instance sterilizing soil with heat delays decomposition
- Soil temperature: rate of decomposition increases with soil temperature
- Soil aeration: adequate oxygen in the soil encourages growth of microorganism and promotes decomposition.
- Soil pH between 6 and 8 promotes growth of microorganisms and thus promotes decomposition
- Pollution kills microorganisms and delays the rate of decomposition

Climatic factors such as rainfall that provides water necessary for rotting

3. (a) Discuss the effect of weeds on crop production. (10marks)

- Compete with plants for nutrients and light leading to low yield
- Parasitic weeds hinder plant growth
- Weeds lower the quality of crops through contamination e.g. black jack seeds
- Weed control is expensive
- Harbor pests and diseases
- May block irrigation channels
- Some weeds produce poisonous substances that reduce plant growth e.g. striga species.
- Water weeds suffocate fish, impede fishing and water transport.
- The presence of weeds limits farm size.

(b) Explain farming practices that encourage weed infestation. (05marks)

- Late planting, make weeds to sprout before planting
- Use of weed contaminated planting materials promoting weed growth
- Continuous tillage destroy soil structure and break up weed rhizomes into pieces that are spread
- Big plant spacing provides room for growth of weeds
- Continuous use same herbicides promote resistant weeds
- Mono cropping promotes growth of the same weeds

(c) Give reasons to explain farmers' efforts to eradicate weeds have not been very successful

- Rapid rate of growth and maturation
- Drought resistant
- Resistant to pest and disease
- Some are parasitic
- Produce large volume of seed to increase their chance of survival
- Vegetative reproduction allows weeds to develop from any part of the plant
- Weeds employ various mechanisms of dispersal using wind, water, animals and self-dispersal mechanisms.
- Produce poisonous substances to crops
- Can obtain nitrogen from carnivorous behavior
- Are protected by structures such thorns and itching hairs that protect them herbivores.
- Some are resistant to herbicides
- Most demand less nutrients
- Some weed have short life cycles

SECTION C (20MARKS)

ANIMAL PRODUCTION

Answer **one** question from this section

4. (a) Explain why housing is important in poultry production (06marks)

- Protects bird from thieves
- Protects bird bad weather conditions
- Protects birds from predators
- Reduces egg loss
- Limit movement and spreading of diseases
- Enables accumulation and collection of manure easy
- Enables easy record keeping and management
- Reduces wastage of feeds

(b) Describe the requirements of a good litter house (09 marks)

- It should strong walls and shutters to protect from thieves
- It should be water proof to avoid dump conditions in the house that can easily invite pathogens.
- It should have proper ventilation to control respiratory infections.
- It should have a impervious floor with litter.
- Should be rodent and wild bird proof to avoid spread of diseases.
- Should be located within outer of the owner for security
- House should be well sheltered from direct sunshine and strong winds.
- The place where the house is to be constructed should be well drained.
- Should be an accessible place so that birds and eggs are easily removed when necessary and taken to the market.
- Should have enough laying boxes in case of layers to reduce chances specifically egg eating.
- Should have enough litter in relation to the bird population.
- Should have resting patches

(c) Outline the importance of having litter in a poultry house (05marks)

- It absorbs moisture and keeps the house dry.
- Dry up dropping.
- Keeps birds scratching and dusting themselves which reduces boredom and stress.
- Soft litter prevents breakage of eggs.
- Keeps the house warm.
- Prevents bird from harming self

5. (a) Distinguish between inbreeding and outbreeding as used in animal breeding. (02marks)

This is that mating of closely related animals like brother and sister, son and mother, etc. while outbreeding is the mating of unrelated animals.

(b) Outline the objectives of livestock improvement. (08marks)

- To maintain desirable qualities in animals like increased number of eggs produced in chicken, high number of off springs born per animal,
- Produce animals with a high mothering ability i.e. low temperament and high milk production
- Produce highly fertile animals that can produce twins or many offspring
- Produce animals with a high growth rate
- Produce animals that can give a lot products like milk and eggs
- To come up with breeds that produce high quality meat, wool, milk and egg
- To produce breeds of animals that are resistant to parasites and diseases
- Produce animals with high feed conversion ratio.
- To produce animals with a high resistance to harsh environmental conditions
- To produce animals that can provide products for a long period of time

(c) Explain measures that can be taken to maintain a high breeding efficiency in a herd. (10marks)

- **Good feeding:** Breeding animals should be fed well but excessive fattening should be avoided as it may reduce the fertility.
- **Observing the rest period:** Animals should be given a rest period of about 60 days to allow the uterus to return to normal
- **Insemination at the right time:** In case of artificial insemination, the cow should be inseminated towards the middle and late part of heat period as ovulation occurs 14 hours after the beginning of estrus.
- **Observation of animals on heat:** This should be done as early as possible more especially where artificial insemination is being used to avoid the animal missing service.
- **Veterinary Attention:** Animals that fail to conceive should be identified and examined to find out the causes and treated if possible.
- **Pregnancy diagnosis:** Animals should be diagnosed to find out whether they have conceived or not so that appropriate measures can be taken in time.
- **Keep accurate breeding records** for the herd to be used as reference were necessary
- Use **teaser bulls** for early detection of heat in farm animals for early service
- **Maintain a good ratio of bulls to females to avoid** over working the bulls which lowers fertility
- **Use correct techniques of artificial insemination** to ensure successful fertilization hence high breeding efficiency
- **Females with abnormal discharges** should examined and treated early enough
- **Know a complete breeding** history of the animals before buying it into the farm

SECTION D (20MARKS)

AGRICULTURAL ENGINEERING

Answer **one** question from this section

6. (a) Explain why stores are important on a farm. (09marks)
- They protect farm machinery from bad weather and theft
 - They increase the value of the farm
 - They reduce wastage on a farm by storing excess produce
 - They increase profitability by storing farm produce until a good price
 - Maintain the quality of the produce stored properly
 - Allow timely harvesting and protect produce from post-harvest pest
- (b) What precautions should be taken to ensure proper storage of farm produce? (06marks)
- Timely harvesting to protect the produce from post harvesting pests.
 - Drying produce to recommended moisture content.
 - Dressing the seeds before storage to reduce pest attack
 - Storing produce 50cm above the floor to avoid dampness
 - Installation of vermin and rodent traps in the store
 - Regularly disinfect and fumigate the store to prevent them from pest invasion.
 - Install firefighting equipment in case of fire outbreak.
 - The walls and the floor should be free of crack not to store pests
 - Stores should have proper ventilation
- (c) Outline problems faced by farmers storing farm produce. (05marks)
- Damages from vermin and rodents
 - Theft from workers
 - Lack modern preservation methods such as freezing.
 - Damage from high moisture content
 - Price fluctuation
 - Inadequate space
 - High costs of rating a store
7. (a) Explain factors that limit the use of animal traction in farming (12marks)
- Unavailability of draught animals
 - Conservativeness of some farmers to adopt to draught technology
 - Availability of alternative sources of power like human labor.
 - Lack of capital to purchase draught animals

- Pests and disease
- Lack of skills to use draught animals on the farm
- Poor climate leading to lack of feeds to draught animals
- Presence of heavy soils in most parts of the country.
- Presence of poor topography characterized by steep slopes and ragged terrain
- Thick and tall vegetation that interfere with animal's work
- Expensive veterinary services
- Unsupportive government policy such high taxation on ox-drawn equipment.

(b) Suggest ways of increasing power output from draft animals. (08marks)

- Pairing of draught animals to increase traction
- Properly maintaining and servicing the ploughs
- Use correct share for a given soil condition
- Ensure proper hitching of plough on the yoke
- Drive the oxen at constant speed
- Clear the field of tall grass and tree stumps before using the animals
- Provide good housing to protect the animal from bad weather.
- Timely treatment of animals.
- Control parasites
- Avoid over working the animals
- Provide good nutrition
- Carry out regular foot pairing
- Work the animal during good weather
- During off season the animals should be made to pull carts to ensure that they do not forget

SECTION D (20MARKS)

AGRICULTURAL ECONOMICS

Answer **one** question from this section

8. (a) Outline problems associated with overpopulation. (08 marks)
- It leads to low standards of living. This is due to high cost of living and low per capita income.
 - It leads to over straining of the available social amenities like water supply, medical services, electricity, roads etc.
 - It leads to food shortage in the economy. This results in famine and malnutrition hence poor health conditions.
 - It leads to excessive demand for goods and services in the economy hence demand pull inflation.
 - It leads to balance of payment problems. This is due to increased importation of commodities in the country.
 - It encourages rural urban migration with its associated problems. This is because people leave the rural areas to come and enjoy the better services in urban areas.

- It increases the levels of unemployment and under employment in the economy as a result of excess population.
- It leads to over exploitation of natural resources hence environmental degradation in form of pollution.
- It reduces government tax revenue in case the majority of the people are poor.
- It encourages political instabilities in form of civil wars due to the excessive pressure on the government for social
- It increases dependence burdens in the economy. This discourages savings and investments due to high consumption expenditure.
- leads to income inequality
- High social costs in form of pollution
- it results in brain drainage
- Limited domestic market due to low income

(b) Discuss measures that can be taken to ensure food security in developing countries (12 marks)

- Intensive farming to produce food in small space
- Large scale farming to ensure large food production
- Mechanization of agricultural production
- Use of improved planting material and animals
- Use of improved production techniques such as use of fertilizers and pest control.
- Land reclamation to increase agricultural land
- Agro-processing to increase self-life of food and reduce wastage
- Importation of food to supplement local production
- Improved transport system to allow movement of food from where it is produced to where it is required.

9. (a) What is **agricultural development**? (02marks)

This a process of improving agricultural capacity characterized by sustainable, efficient utilization of factors of production.

(b) Explain the role of government in promoting agricultural development (12marks)

- Liberalization of agriculture enabling private investors.
- Construction of dams and setting up irrigation schemes to enable cropping throughout the year.
- Provision of agricultural inputs such as fertilizers at subsidized prices.
- Development of improved planting materials.
- Provision of agricultural extension services.
- Provision of better tools equipment and cheap short and long-term credit.
- Encourage and assist farmers to form cooperative unions to source cheap inputs and market for the produce.
- Provision of water through valley dams and borehole to livestock in dry areas.
- Improvement of road network in rural area to enable marketing of produce and acquisition of inputs
- Construction of collection centres and modern storage facilities for produce.

- Promote agro-processing in order to add value to agricultural produce.
- Universal education to reduce illiteracy and ignorance
- Land reclamation to increase agricultural land

(c) Why are extension workers important in rural agricultural development? (06 marks)

- They train and educate farmers on modern farming practices to boost agricultural productivity.
- Train farmers on agribusiness techniques such as book keeping
- They encourage people in farming business to improve rural livelihoods
- They empower rural communities on their social economic and health aspects such as HIV prevention.
- They improve nutrition and household income through increased productivity and market oriented farming.
- Promote agricultural innovations
- Empower marginalized groups in agriculture such women and youth to access and utilize agricultural resources.
- Promote cooperation of farmers
- Provide agricultural advisory services.

END

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Thanks

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